
**CLEANER PRODUCTION: CASE STUDY ANALYSES EXAMINING
APPLICABILITY TO URBAN ENVIRONMENTAL PROBLEMS**

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TABLE OF CONTENTS

I.	Executive Summary.....	3
II.	Introduction.....	4
III.	A New Perspective on Urban Environmental Problems.....	7
IV.	Cleaner Practices for Cities.....	11
V.	Case Study Analyses.....	14
	1. Batangas Bay, Philippines: A Regional Program of Cleaner Practices for Cities	
	2. Cebu, Philippines: Decentralization Promotes Cleaner Practices for Cities	
	3. Rayong, Thailand: Industrial Estates—Cleaner Practices for Cities Platforms	
VI.	Conclusions/Recommendations.....	29
VII.	Appendices: Detailed Case Studies Information.....	32
	1. Cebu, Philippines	
	2. Rayong, Thailand	
	3. Batangas Bay, Philippines	
VIII.	References.....	50

I. EXECUTIVE SUMMARY

Over the last 25 years, Asia and much of the world experienced a dramatic shift in economic activity from rural agrarian to urban and industrial centers. From 1977 to 1997, the fraction of GDP in Asian countries resulting from agricultural activities dropped from 35 to 18 percent of total GDP.¹ Simultaneously, a mass movement to urban areas accounted for urban populations growing from 19 to 33 percent of total populations in Asia.² These events led to the acute environmental problems we face today in our cities.

Building from a conceptual framework that considers theories on industrial ecology and natural capitalism, the challenge for all nations is to affect a positive change in attitudes and values towards the environment, economic growth and basic human needs. The interrelationships among the environment, economics and basic human needs demand a conceptual framework akin to our value system. In our cities today, fundamental breakdowns in how we manage these interrelationships promotes inefficiencies in resource utilization and waste management. Targeted Cleaner Production (CP) strategies repair these breakdowns, enabling efficiency improvements that reap environmental and economic gains.

Due to the growing strain on our environment from urban activities that adversely impact the environment, urban areas offer intriguing opportunities for experimenting with a variety of CP strategies. Under the aegis of the Asian Development Bank's Regional Technical Assistance project, the US-Asia Environmental Partnership initiated this study to highlight case studies illustrating opportunities for introduction of Cleaner Production strategies into urban areas. This effort focuses attention on what can work in urban settings. Specifically, we examined three cities in Asia: Rayong in Thailand, and Cebu and Battangas in the Philippines.

In this study, we examined what cities are doing today to achieve sustainable solutions and how Cleaner Production strategies can be effectively applied. Since CP traditionally applies to industrial facilities, we propose to modify the terminology for urban areas, denoting relevant strategies as Cleaner Practices for Cities (CPC). Our analysis indicates that seven critical elements need to be present to enable successful implementation of CPC strategies in urban areas:

1. Support at the highest levels
2. Involvement of all relevant stakeholders
3. Development of a policy framework
4. Linking economic to environmental performance
5. Establishment of measurable goals

¹ *Asian Environment Outlook 2001; Asian Development Bank; Annual Meeting Seminar; "Win-Win Policies for a Better Environment;" Discussion Draft; May 2000; p83.*

² *Ibid.*

6. Sufficient financial support
7. Implementation of a focused action plan

While this list of critical elements is not meant to be all-inclusive, past experience combined with an understanding of the dynamics at work in cities today suggest that some or all of these elements are critical to successful integration of CPC strategies.

This study offers a preliminary blueprint for successful implementation of CPC strategies and practices in urban areas throughout Asia. By studying environmental and economic practices in a few cities, we hope to encourage broad dialogue on application of CPC strategies and promotion of sustainable urban practices. The time to act is now. Our future on this planet hangs in the balance.

II. INTRODUCTION

There is a growing recognition among policymakers worldwide that human activities increasingly strain our life-sustaining biosphere: Earth. Beyond the telling signs of environmental degradation caused by human activities—polluted air, water and soil—there are more insidious threats from global warming, acid rain, non-renewable resource depletion and species extinction. Human population continues to grow exponentially, doubling over the last forty years, and we expect our population to double again in the next 75 years.³ Urban areas, especially areas supporting heavy industries such as steel or chemical manufacturing, exhibit acute signs of such strain on our ecosystem. Toxic chemical exposure, overloaded sanitation systems, polluted air, contaminated drinking water, congestion, overcrowding and urban sprawl illustrate the increasing strain placed on the ecosystem in cities worldwide. While it is essential to address global threats to the environment, solving acute environmental problems experienced in urban areas demands sustainable solutions that balance the economic growth and environmental protection needs of cities.

Historically, environmental debates are driven by tension over whether economic growth and environmental protection can coexist peacefully. As this debate matures, mounting evidence suggests that reducing inefficiencies traditionally leading to adverse environmental impacts can not only be accomplished without sacrificing economic gains, it can bolster economies by leading to increased investment, urban "livability," and improved service delivery. These concepts are squarely rooted in the notion of Cleaner Production.

Based on these convictions, the Asian Development Bank is assuming a leadership role to promote Cleaner Production policies across Asia and spur a much needed policy

³ Starr, Chauncey; *Technological Trajectories and the Human Environment*; National Academy Press; Washington, D.C.; 1997; p185.

dialogue to institutionalize positive change. To improve environmental protection and make progress toward sustainable development, the Bank's developing member countries are also seeking to implement integrated strategic initiatives designed to accelerate policy reforms and practices related to Cleaner Production. One of the best opportunities for integrating CP practices lies with our urban areas, which offer great potential for resource productivity and efficiency gains as well as recycling and solid waste management improvements, to name a few areas.

In this leadership role, the Asian Development Bank initiated a project titled the Regional Technical Assistance (RETA) for the Promotion of Cleaner Production Policies and Practices in Selected Developing Member Countries. The goal of the project is to accelerate the development of national policies and action plans for the adoption of Cleaner Production (CP) in Asia. To achieve this goal, the RETA project promotes sustainable practices in five Asian nations—India, Indonesia, The Philippines, Thailand and Vietnam—to develop the policy framework, integrated plans and institutional capabilities necessary for rapid and efficient adoption of CP. The results of these efforts will be extended to other Asian nations through a variety of information transfer mechanisms.

To expand project benefits beyond the participating Asian nations, the RETA: (1) involves training on subjects such as policy development, CP planning and emerging areas for CP applications to a larger audience of Asian nations; (2) uses the experience of participating countries to develop generic guidelines for national policies and plans; and (3) builds mechanisms to facilitate regional networking, cooperation and coordination among assistance agencies and other interested parties in Asia.

Implemented over a one-year period, the RETA project includes the following elements:

- National background papers assessing experience and current policies and plans for CP,
- Development of policy frameworks to support CP in participating countries,
- Facilitation of national level coordination among donors, assistance organizations, government, NGOs, business and other interested parties,
- Establishment of national CP action plans in participating countries,
- Identification of new financing mechanisms and market-based instruments to promote CP,
- Development of general guidelines for national policy framework and action planning,
- Defining opportunities for regional cooperation among donors and assistance agencies,
- Establishment of regional networking and exchange of information on CP,
- Case studies of newly emerging areas for application of CP, and
- Building human and institutional capability through regional training workshops.

Cleaner Production policies and practices, including waste minimization, pollution prevention, recycling, and community-based environmental protection approaches offer a set of strategies designed to balance a region's environmental and economic needs. Cleaner Production employs a broad array of process- and technology-driven innovations to enhance the environmental performance of entire systems or industrial processes without compromising the economic development needs of an area or facility. In this context, systems can include industrial sectors, industrial facilities, which may contain one or more distinct industrial processes, urban areas, or even regions with multiple urban areas. Given the migration to cities and the links between urban and industrial centers in Asia, CP strategies integrated into urban activities can have potentially far greater impacts than by simply limiting CP efforts to isolated industrial facilities.

International focus on sustainability issues surrounding urban areas has led to an unprecedented level of cooperation among cities all over the globe. While there is broad recognition that the symptoms of environmental degradation, e.g., acid rain, global warming, non-renewable resource depletion, etc., know no physical boundaries, corresponding efforts to address these symptoms remain limited by political, socio-economic, cultural and institutional barriers to implementing cross-jurisdictional solutions. City governments seeking practical tools for encouraging improved environmental results in urban areas increasingly turn to each other for lessons learned, information sharing and ideas for innovative approaches to urban sustainability.

Building on this cooperative spirit, the United States-Asia Environmental Partnership examined how Cleaner Production strategies can help Asian cities meet the challenge of urban sustainability. While Asian cities face challenges common to many cities around the world, unique opportunities exist in Asia for implementing CP strategies. For these reasons, we have carefully selected case studies in Asia that offer promising opportunities for introducing targeted CP approaches. We also highlight success stories in cities around the globe to illustrate how CP can work in practice. These examples offer lessons learned and useful tactics for application in Asian cities.

As you will see there are no easy answers. We are in the middle of learning more about the process to better understand complex interactions in urban settings in order to prescribe appropriate remedies for our urban ills. This is a first step towards sustainability. Further research on the complexities of urban processes and the applicability of Cleaner Production strategies is needed to enable policymakers to make informed decisions on the ways that such strategies can be applied to urban areas.

The next section provides a conceptual framework for examination of the case studies offered in this paper. Section IV builds on this thinking by looking at the practical implications of applying CP strategies to urban areas. Section V summarizes the salient information on each of our three case studies—Batangas, Rayong and Cebu—with more detailed information on each city available in the appendices.

III. A NEW PERSPECTIVE ON URBAN ENVIRONMENTAL PROBLEMS

Residents and local businesses typically view urban governments such as cities or municipalities as service providers. Common environmental services provided at local levels include solid waste collection and disposal, sewage treatment, and ensuring availability of a safe water supply. These services along with other local government functions are often organized in a 'stovepipe' manner minimizing communications, idea sharing, resource pooling and other interactions among functional areas. This traditional approach to local government organization encourages a similar 'stovepipe' approach to environmental management. Within each functional area, environmental goals are pursued and environmental requirements achieved with little or no attention to environmental needs or requirements in other functional areas. This approach to environmental management by local governments maximizes inefficiencies and encourages internal competition for resources without regard to the overall environmental needs of the local government system. New models must be explored and innovative ideas tested in order to break out of this traditional urban environmental management model.

The Hague, Netherlands: The Greening of a Municipal Corporation

The Hague, Netherlands with a population of 450,000, implemented an Integrated Environmental Management Program to promote environmentally responsible civil servants and environmentally efficient workspaces by putting in place departmental environmental management systems. All 22 municipal departments in The Hague, with some 12,000 employees, were given the mandate to establish an integrated environmental management system within their department. The decentralized process used in the project was found to work best within a structured framework, which managed and integrated inter-departmental activities and communications. Two additional factors were found to contribute to the success of the process: the careful selection of motivated leaders for the environmental coordination role within each department, and the support of the board of directors of the departments.

Source: [*"Local Initiatives 1"*](#) ICLEI

Industrial Ecology and Natural Capitalism

One of the ways that industry and cities can address the inefficiencies in treating symptoms rather than underlying sources of environmental degradation is by adopting a new view of how complex systems adversely affecting the environment can be managed. The term 'Industrial Ecology' embodies innovative thinking on ways that business can operate in this era of sustainable development. This conceptual model potentially could be extended to urban areas.

The environmental agendas of companies and governments today are frequently driven by lists of individual issues, such as eliminating the use of chlorofluorocarbons (CFCs), promoting recycling, increasing energy efficiency, and minimizing the production of hazardous waste, because there is no accepted overall framework to shape comprehensive programs. As Hardin Tibbs points out in his landmark 1992 article, *Industrial Ecology: An Environmental Agenda for Industry*,

"The ultimate driver of the global environmental crisis is industrialization, which means significant, systemic industrial change will be unavoidable if society is to eliminate the root causes of environmental damage. The resulting program of business change will have to be based in a far-sighted conceptual framework if it is to ensure the long-term viability of industrialization, and implementation will need to begin soon."

Tibbs proposed that industrial ecology provide this needed conceptual framework explaining that,

"Industrial ecology involves designing industrial infrastructures as if they were a series of interlocking man-made ecosystems interfacing with the natural global ecosystem. Industrial ecology takes the pattern of the natural environment as a model for solving environmental problems, creating a new paradigm for the industrial system in the process. This is "bio-mimetic" design on the largest scale, and represents a decisive reorientation from conquering nature—which we have effectively already done—to cooperating with it."

The concept of industrial ecology does not just apply to industry. Rather, the essence of the industrial ecology message as applied to cities is threefold: first, urbanization is a significant threat to the natural environment, particularly given the worldwide population growth curve and the migration of population to urban centers; second, planning to handle unbridled growth and urban strain must be far-sighted and comprehensive; and third, sustainability ultimately results from well-implemented, focused and measurable programs.

More recently, this conceptual model has been modified to transform traditional views of capitalism in the global economy to include new categories and valuations of capital. 'Natural Capitalism' embodies this new mind-set. Natural capitalism "enables countries, companies and communities to operate by behaving as if all forms of capital were valued."⁴ The four central strategies of natural capitalism are:

⁴ Hawken, Paul, Amory Lovins and Hunter Lovins; *Natural Capitalism: Creating the Next Industrial Revolution*; Little Brown and Company; Boston, Massachusetts; 1999; p10. Please note that this book introduces the concept of 'natural capital' comprising resources, living systems and ecosystem services (e.g., photosynthesis converts Carbon Dioxide to Oxygen).

1. **Radical Resource Productivity**—using resources more efficiently slows resource depletion, lowers pollution and creates jobs,
2. **Biomimicry**—redesign of industrial systems along biological lines enables constant reuse of materials in closed continuous cycles, and often eliminates toxicity,
3. **Service and Flow Economy**—shifting from an economy of goods and purchases to one based on a flow of economic services entails a new perception of value, where the acquisition of goods as a measure of affluence evolves to an economy based on the notion that continuous receipt of quality, utility and performance promotes well-being, and
4. **Investing in Natural Capital**—reversing environmental degradation by reinvesting in sustaining, restoring and expanding stocks of natural capital, so that the biosphere can produce more abundant ecosystem services and natural resources.⁵

Implemented effectively, these strategies together can reverse environmental degradation, spur economic growth and increase meaningful employment opportunities.

Sustainable Regeneration in Bergsjön, Sweden Ecological Enterprises and the 'Recycling House'

In 1993, the ground floor of an apartment, some adjoining apartments and part of a car park were converted into the 'Returhuset' ('recycling house'), an incubator space for green enterprises. The idea was to combine employment, training and environmental objectives—demonstrated at the outset by providing unemployed residents with temporary work refurbishing the apartments. Returhuset now provides a base for re-use/recycling enterprises including carpentry, electrical goods, jewelry, metal, and bicycle workshops. Some of these enterprises refurbish goods donated by residents. Returhuset also includes an 'eco-café' and small library, recycling shop, exhibition center, a media workshop, and a classroom for training unemployed people to be environmental advisers.

Source: Frida Arhel, Forum for the Future, "Future Local Economy Programme case study," November 1998.

Extending this framework to address the challenges behind urbanization, communities need to rethink traditional urban activities by targeting opportunities for introducing sustainable practices. Resource productivity must be stressed—e.g., recycling centers promoting ecological practices could be nurtured into profitable enterprises. Viewing urban activities as analogous to biological processes, increasing efficiencies to reduce

⁵ *Ibid*, p10-11.

resource inputs and minimize waste outputs in an effort to develop closed-loop systems. Traditional goods and purchases are transformed into services, where consumers could, for example, lease products such as washing machines and return the product to the manufacturer for upgrade or retrofit. The manufacturer could then recycle returned products. Finally, investments in the protection and replenishment of natural resources, ecosystems and living systems must be a priority for communities (e.g., protection of marine life along coastal areas).

Community-Based Examples of Sustainable Practices

Extending the tenets of industrial ecology and natural capitalism to environmental decision-making within communities prompts an examination of potential models for application to solving urban environmental problems in a sustainable manner. The following two U.S. examples illustrate ways that industry and communities can work together to promote sustainable practices.

1. The Good Neighbor Project for Sustainable Industries—The Good Neighbor Project (GNP) in Cambridge, Massachusetts, USA, provides an innovative approach to empowering local residents to promote only sustainable, non-polluting industries within their communities. GNP provides legal, technical and strategic expertise to help residents secure "Good Neighbor Agreements," which are legally-binding documents signed by the corporation and all community stakeholders that contain solutions to the community's environmental and economic concerns. These legally binding 'goodwill' instruments encourage the propagation of sustainable industries in urban areas. A key to the GNP approach is to identify and enlist the support of community stakeholders, particularly the community workforce. As this example suggests, turning community residents into active participants in urban decision-making can encourage the support and commitment necessary to promote sustainable practices in urban areas.⁶

2. Fighting Poverty and Protecting the Environment: Development of a Sustainable Technologies Industrial Park—Northampton County, Virginia, USA transformed itself from an economically depressed community into a twenty-first century model of cohesive sustainable development through proactive efforts to improve both economic and environmental conditions. The anchor of Northampton's sustainable economic redevelopment strategy is the Port of Cape Charles Sustainable Technologies Industrial Park (STIP). The fruit of an innovative partnership of local, federal, and private investors and stakeholders, the STIP will attract national and multinational businesses committed both to profitability and to environmental and social integrity. It will house facilities that boast advanced features for resource efficiency and pollution prevention. The STIP has already attracted its first tenant--a manufacturer of photovoltaic energy equipment. This example illustrates how sustainable solutions can produce both economic and environmental gains, contradicting traditional notions that

⁶ Source: Center of Excellence in Sustainable Development. Visit www.sustainable.doe.gov for more information.

environmental gains have economic tradeoffs. Many other eco-industrial park examples exist worldwide and offer opportunities for examining what works best.⁷

These urban sustainability projects highlight the value of fighting against traditional notions of community-industry relationships to proactively look for sustainable solutions that meet urban needs. Redefining the conceptual framework for evaluating economic and environmental policy alternatives allows for innovative thinking, opening the door to implement sustainable solutions. So, moving from concepts to implementation strategies, we now look at how Cleaner Production can be applied to urban settings.

IV. CLEANER PRACTICES FOR CITIES

Cities today range in complexity from modest collections of mono-industrial centers (e.g., mining communities) to complex mega cities with multiple interconnected industry sectors. Municipal environmental services similarly range from small governments providing minimal solid waste collection to large operations serving big cities involving a range of complex activities. Identifying appropriate opportunities for introducing Cleaner Production strategies means crafting approaches that account for these differences. Additionally, it is important to note that CP traditionally applies to industrial rather than urban processes.

Transferring CP to urban areas requires that we first define our terms. What do we mean by CP? CP in an industrial context means:

“The continuous use of preventive and integrated environmental management strategies related to production processes, services, and products to improve an organization's profitability and also reduce risks to the environment and human health.”⁸

In practice, CP represents a pollution prevention and risk reduction methodology designed to control pollution at its source rather than using costlier, less effective "end-of-pipe" approaches. More significantly, CP links environmental and economic gains together. Instead of implementing approaches that involve environmental vs. economic tradeoffs, CP challenges this notion with solutions that have both environmental and economic benefits. Extending CP approaches to cities first requires a comparison of industrial and urban machinery.

In many ways, cities and industries mirror each other. Indeed, a large corporation offers an analogy to a city, where the Mayor may be likened to a CEO, the City Council

⁷ *Ibid.*

⁸ *Asian Development Bank; Technical Assistance endorsed by the RETA screening committee on 17 December, 1998; ADB Business Opportunities; January 1999.*

to a board of directors, and citizens to the shareholders. In this analogy, the elected officials are directly accountable to the voters, or shareholders. Cities have permanent employees, can operate many facilities (e.g. electric, water and waste facilities), and may own a fair amount of land. Cities impact the environment while performing functions such as maintenance of bridges, roads, transport systems, police/fire stations, and water supply and solid/wastewater treatment plants. Such infrastructure projects and corresponding public services directly impact a city's landscape and its citizens. In a Democracy, city government and the elected officials are held publicly accountable on matters of fiscal responsibility. And, just as consumers expect excellence from the products they purchase, urban residents seek "livable" well-run cities.

CP for cities builds on these similarities by selectively applying industrial CP strategies to urban practices, accounting for any differences that shape decision-making processes in cities. These modified, or smart, strategies should increase the efficiency of urban process inputs, such as energy, and simultaneously lower outputs such as wastes. For example, establishing recycling centers in cities reduces wasteful consumption practices by encouraging reuse of materials and products. Modifying the CP definition for industrial production to apply to cities, we get the following definition of Cleaner Practices for Cities (CPC):

The continuous use of preventive and integrated environmental management strategies related to a city's municipal services to improve the efficiency of its financial expenditures and simultaneously reduce risks to the environment and human health.

If cities added establishment of recycling centers as a municipal service, for example, urban areas could benefit from higher efficiencies and reuse. Such benefits include jobs for local residents, higher business tax income for cities from establishing new businesses, and reduced waste outputs that lower the cost of solid waste management in urban areas.

In Asia, CPC encompasses actions taken by a local government unit (LGU) to encourage better service delivery, building efficiencies into policies and planning for infrastructure development, while encouraging the adoption of CPC strategies at industries within its jurisdiction. CPC introduces new approaches to the operation of a LGU, including but not limited to its environmental services, e.g., solid waste collection. CPC modifications are designed to transform the physical services that a LGU provides, which include administration, road maintenance, street lighting, water supply, sewage collection, treatment and disposal, and solid waste collection and disposal, to sustainable activities.

So, if Cleaner Production for Cities can improve physical service delivery in a city, and help to alleviate infrastructure strain, environmental and health threats, and offer economic benefits why isn't it practiced more widely? Indeed, what are the barriers to implementing CPC in cities and municipalities? There are numerous barriers that exist in varying degrees in any geographic location examined. They include information void, inadequate planning, lack of data or poor statistical record keeping, competing

political pressures, factions with conflicting interests, short-term goal setting tied to political terms of office, fragmented populations, unorganized stakeholder groups, lack of transparency in policy making, and countless other barriers. Rather than discuss barriers, we focus on what elements need to exist to successfully implement CPC strategies.

In the course of examining what works in cities around the world, we uncovered some common elements to successful implementation of sustainable practices in urban areas. Our observations indicate the following seven “critical elements” or ideal conditions typically exist for successful implementation of sustainable CPC practices.

- Support at the highest levels of the community, such as a city mayor or other city officials, as well as non-government community leaders;
- Involvement of all relevant stakeholders within the community in a way that ensures the process is transparent;
- Development of a policy framework promoting sustainable growth. A supportive framework includes clearly stated community objectives, policies, executive directives or decrees, or even a comprehensive regulatory and enforcement regime;
- Establishment of the clear link between economic performance and environmental performance communicated in understandable ways to all stakeholder populations;
- Development of measurable goals and a system of measurement and benchmarking (relevant for both short and long term success);
- Sufficient financial support to enable projects to move forward. Very often seed funding at a minimum is necessary to initiate CPC strategies; and finally,
- An implementation strategy to move toward CP through an achievable focussed effort. By this, we mean that CP programs that are most successful tend to be targeted in scope, encountering fewer barriers and increasing the likelihood of success and acceptance.

While this list of critical elements is not meant to be all-inclusive, our observations combined with an understanding of the dynamics at work in Asian cities suggest that some or all of these elements are critical to successful integration of CPC strategies.

Efforts are made throughout the following sections to identify these critical elements, where possible. The next section of this report covers case studies on three Asian cities chosen as 'model cities' for application of CPC strategies.

V. CASE STUDIES: BATANGAS BAY, CEBU AND RAYONG

Introduction

This section examines three case studies offering insights designed to shape approaches for implementing CP strategies in urban areas within Asia. These case studies were selected for a number of discriminating reasons. First, the information was available and local officials were supportive. The selected regions were dynamic, involving a range of industrial, economic and environmental issues for consideration. Lastly, our research indicates that sufficient political will exists to experiment with application of CPC strategies in these urban areas.

In the course of conducting the research, we were able to refine our information collection efforts based on the limitations to data on Cebu and Rayong. These refinements led to a number of specific questions that formed the basis of our research at Batangas Bay. These questions include:

- What CPC techniques have been tried by LGUs to reduce the environmental impact of its own operations?
- What have LGUs done to try to influence industry to be cleaner?
- What are the results to date?
- What are the obstacles?
- What financial mechanisms or MBIs have been utilized?
- Were there particular cultural conditions, which should be considered in applying this experience in other locations?
- What else might the LGU try?
- What existing national policies make it difficult for LGUs to take action?
- What could national government do to encourage or make it possible for LGUs to take action?

The first case study highlights Batangas Bay, providing greater specificity than possible in the Cebu or Rayong case studies.

While this effort was not intended to be exhaustive in scope, it is hoped that the information offered in these case studies, at a minimum, guides additional research into ways to implement CPC strategies in urban settings. One of the biggest limitations to the information provided here stems from the vast differences in demography, socio-economics, industrial makeup, and political structures among cities throughout Asia. This limitation makes it difficult to extend the conclusions drawn here to other cities. However, we can use the information contained here to present a set of lessons-learned for consideration in similar urban settings.

This report has been organized in accordance with the terms of reference (TOR) for the study prepared for ADB. Batangas, Cebu and Rayong are discussed sequentially. It should be stated here that CPC is a new concept, and therefore, documentation of city

CPC activities was anticipated to be minimal from the outset (as verified by our fieldwork). However, our fieldwork did uncover a great deal of information about activities in Batangas Bay, Philippines in particular, demonstrating how CPC can be applied in urban areas. Heavy emphasis has been placed on identifying the powers, responsibilities and financial resources of city governments, as these are key in determining their capabilities to undertake CPC activities. Any conclusions and recommended actions are based on both existing and expected future direction of Batangas, Cebu, Rayong and LGUs in general in the Philippines and Thailand as well as other nations in South East Asia.

Batangas Bay, Philippines: A Regional Program of Cleaner Practices for Cities

Regional approaches to environmental protection offer a framework for implementing Cleaner Practice for Cities strategies. Batangas Bay environmental improvements are accomplished under the guidelines of its regional planning tool, the Strategic Environmental Management Plan. Batangas goes one step further by illustrating both a regional framework and real efforts to improve the region's environmental performance. Establishing new policymaking authorities and regional planning bodies, training, filling in data gaps, and attracting outside financing represent some of the ways that this regional Plan is implemented. Voluntary agreements between industry and government offer another mechanism for environmental performance improvement. Together, these tools offer a dynamic model for researching ways to integrate CPC in Batangas.

This case study builds on the experience of conducting research for Cebu and Rayong, which are covered in the following two case studies. The format of this case study differs from the format for Cebu and Rayong, flowing instead from the series of questions highlighted above. These questions and corresponding answers are detailed below.

1. What CPC techniques have been tried by the LGU in Batangas to reduce the environmental impact of its own operations?

In 1991, the Republic Act 7160 Philippine Local Government Code (LGC) was enacted mandating devolution of decision-making, planning, and finance functions to the LGUs. The responsibility for the environment and natural resources is now shared with the LGUs. The LGC transforms LGUs into self-reliant communities and active partners in the attainment of national goals through a more responsive and accountable local government structure instituted through a system of decentralization.

In 1995, the LGU in Batangas along with public and private sector stakeholders created the Integrated Coastal Management Project (ICMP). Program objectives include developing and demonstrating a workable model for the reduction and prevention of marine pollution along with instituting improved risk management practices. The ICMP led to development of a Strategic Environmental Management Plan (SEMP) for implementation by the LGU after 1998. The SEMP has six components for implementation over the next twenty years:

A. Legal and Institutional Mechanism—supports the establishment and strengthening of legal and institutional frameworks and organizational structure to plan and implement integrated environmental management programs. Specifically, two institutional structures have been established:

- Batangas Bay Region Environmental Protection Council - this is a multisectoral policy-making body composed of the Provincial Governor, the mayors of the coastal municipalities and cities along the Bay, and representatives from other government agencies, private sector, non government organizations and communities; and
- The Provincial Government-Environment and Natural Resources Office (PG-ENRO)—is a coordinating unit that assists the Council by integrating existing and planned actions by the LGUs with other sectors in the Batangas Bay Region (BBR). PG-ENRO coordinates the implementation of environmental management programs in the province, develops operational plans and strategies for implementation of environment and natural resources programs and projects, enforces pollution control and environmental protection laws, rules and regulations, and coordinates the implementation of integrated coastal management programs.

The PG-ENRO was a prerequisite for the development of the multi-sectoral coordinating mechanism. It performs the functions devolved from the DENR and coordinates implementation of the SEMP.

Another group created to represent industry in the region was the Batangas Coastal Resources Management Foundation, which is a non-governmental organization consisting of representatives from firms operating within the Bay. Its primary function is to explore ways in which public and private sectors can cooperate and benefit from efforts to manage Batangas Bay coastal resources.

B. Integrated Policy and Planning Systems—the SEMP provides for: (a) integration and improvement of national, regional, provincial, and municipal plans and policies in environmental management; (b) conversion of the SEMP into a land and water use plan to be used as a guide for future development in the region; (c) update or development of improved policy support systems concerning land-and water-use zoning, market-based instruments (MBIs) application, and resource-use pricing structures; and (d) strengthening of enforcement and monitoring capability of the PG-ENRO and the LGUs. An example of a priority action under this component includes application of pricing mechanisms and MBIs to improve solid waste collection and reduce discharge of waste into rivers and coastal waters.

C. Integrated Management Systems and Technical Interventions—this component encourages improvement of management systems and application of technical solutions to solve environmental problems in the region. Critical environmental issues in the region include: (a) integrated waste management; (b) water pollution abatement; (c) conservation of coastal ecosystems (mangroves and coral reefs), (d) coastal tourism development; (e) municipal fishery development, and (f) alternative livelihood development. Examples of a priority action under this component are training and workshops in pollution management appraisal for industries.

D. Management and Technical Skills Improvement—this component includes: (a) training to the PG-ENRO personnel, LGU staff involved in environmental management, and others in planning and managing effective and sustainable implementation of the SEMP core programs; (b) organizational services to the coastal communities to generate initiatives for environmental management and community development; and (c) multi-sectoral information, education, and communication systems to promote integration of environmental education into the curricula of primary and secondary schools in the region.

E. Information Base Improvement—this component addresses the lack of an information base required for a more scientific assessment of environmental issues and for determining an appropriate management structure for the Batangas Bay region. The Regional Programme for the Prevention and Management of Marine Pollution in the East Asian Seas (MPP-EAS), the private sector, academe, and external support organizations carried out the priority research activities of the SEMP. The research, which focused on key environmental data gaps identified in the environmental profile of the BBR, needs to be carried out by 2001 for the updating and improvement of policies, plans, programs, and strategies. The PG-ENRO participated in these activities.

F. Sustainable Financing Development—this component identifies and develops innovative financing mechanisms including privatization, build-operate-transfer schemes, trust fund establishment, and mobilization of government and private sector resources to help sustain implementation of SEMP. Financing of other aspects of the SEMP (management and technological capacity-building activities, action plan formulation and some capital-intensive projects) is accomplished through long-term resource generation targeting foreign funding institutions and local donors.

In addition to implementation of the SEMP, the Provincial Governor passed an ordinance in 1996 declaring the SEMP document as a major LGU administrative guide in the formulation of future development, environment policies, plans and programs. Another initiative is the signing of a Memorandum of Understanding (MOU) between the DENR Secretary and Governor Hermilando Mandanas, concurrent chairman of the Batangas Bay Region Environmental Protection. This MOU is aimed at strengthening and streamlining the EIA process in the region; potentially devolving functions to BBREPC, the LGUs in BBR, the DENR Regional Office and the PENRO; enhancing local participation in decision-making; and formulating guidelines and a specific action plan for effective implementation of the Philippine EIA system in the Batangas Bay Region.

2. What has the Batangas LGU done to try to encourage cleaner industrial practices in the region?

The Provincial Governor passed Ordinance No. 3 Series of 1996 - Adoption of a Strategic Environmental Management Plan. The ordinance formally adopts the 20-year SEMP along with an Integrated Waste Management Plan. Furthermore, it facilitates

access to the larger financing institutions as a reflection of the LGU's political commitment.

3. What were the results of efforts to improve regional environmental performance?

The creation of a multi-sectoral organization (Batangas Bay Region Environmental Protection Council) provides the most effective institutional mechanism for environmental management in Batangas Bay Region. The Council is the highest policy- and decision-making body, while implementation and enforcement actions are made by either national or local entities according to their legal mandates. Also, passage of the Ordinance declaring the SEMP a major LGU administrative guide signaled the government's strong commitment to environmental improvement.

Voluntary agreements between the LGU and local industries in the Bay area reduce the quantity of waste generation to target levels and eliminate illegal dumping of wastes. These agreements bring the public and private sectors together to jointly develop an affordable long-term waste management system for both hazardous and non-hazardous wastes and to have the facilities and services in place by the year 2000. Large industrial firms located in the Bay area are responsible for periodic monitoring of equipment operations and facilities, as well as the submission of compliance reports to the DENR.

The SEMP established a structure and mechanism to integrate CPC in the region. The Plan led to partnerships among LGUs, private and public sectors, and non-governmental organizations. The PG-ENRO and Council plan to convene roundtable discussions and workshop sessions with stakeholders, including community representatives, to evaluate the SEMP and to prioritize actions to address key environmental issues. Thus, an excellent opportunity exists to integrate CPC as an element in environmental strategies not only in the two cities and 32 municipalities of Batangas Province, but also in the country's 78 provinces, 80 cities, and 1,600 municipalities 86 percent of which is coastal.

4. What were the obstacles to improving regional environmental performance in Batangas?

The rationale for the creation of an ENRO by the Provincial Government of Batangas was to exercise the functions devolved from the DENR, and coordinate implementation of the SEMP. The PG-ENRO, as the Council's technical secretariat, coordinated the activities of the various entities involved. The devolution, however, was not comprehensive enough, because it did not decentralize similar authorities down to the city and municipal units.

LGUs have had very limited experience in mobilizing their own financial resources, given the traditional "big brother" relationship with the national government. There are suggestions that it is time to revisit the Internal Revenue Allotment (IRA) formula for LGUs. The present formula may not help local governments become financially

independent under a decentralized government. In the long run, it is perpetuating a system of non-performing LGUs and poor financial management. Many local governments suffer from low tax collections due to inefficiency and to an ingrained culture of dependency on grants and subsidies. As a result, they depend mostly on IRA, which goes against the grain of self-reliance and local autonomy. This financial aspect is highly relevant in the promotion of CPC because alternatives such as imposing fines on effluent discharges or charging user fees are very unpopular measures.

An unavoidable reality in doing anything in the Philippines is the "politicization" of processes and strategies, particularly in high-profile projects. The Batangas Bay project is no exception. This is especially true where political affiliations among provincial, city, and barangay policymakers differ. As a result, plans are sometimes scuttled, implementation delayed, or projects are derailed altogether. While politicization of the process is nothing new to the policy process, it presents an obstacle to effective integration of CPC strategies in Batangas.

Some other obstacles include:

- CPC strategies and environmental projects of LGUs are not prioritized in local budgeting and development planning processes,
- The planning body of Batangas City is aware of the costs of environmental issues left unresolved, yet there is no indication that these are priority concerns. The strategies developed to address environmental problems appear to be end-of-pipe in nature rather than preventive, self-renewing, or sustainable,
- Existing legislation and industrial investment promotions make no mention of attracting cleaner industries or of giving incentives to potential CPC investors,
- There are no comprehensive public policies in place to promote CPC. Existing policies relate to conservation of the environment in general,
- Another deterrent is an existing policy of the Philippine National Planning Body (National Economic Development Authority) which prohibits an LGU from using Grant Funds for "brown sector" projects such as solid waste management,
- LGUs have been granted broad environmental management powers, but these powers are not well defined and, in some cases, are in conflict with the powers of other agencies. There are several issues and challenges facing the LGUs, foremost of which is their lack of capability to perform their mandate as co-managers of the environment, and
- Environmental problems of LGUs are influenced strongly by land use, and this close link suggests that overall solutions depend also on addressing the largely uncontrolled process of land development.

5. What financial mechanisms or Market-Based Instruments (MBIs) were used?

The SEMP document included a section on financial mechanisms. However, to date it has not been implemented. This section in theory identifies and develops innovative financing mechanisms including privatization, build-operate-transfer schemes, trust fund establishment, and mobilization of government and private sector resources to help sustain implementation of SEMP.

6. Are there particular cultural conditions in Batangas, which should be considered in applying this experience in other locations?

While we did not identify any specific cultural conditions, an unavoidable reality in doing anything in the Philippines is the "politicization" of processes and strategies, particularly in high-profile projects. As a result, plans are scuttled, implementation is delayed, and projects can be derailed altogether. Fortunately, politicians can sometimes find common ground on environmental protection—a major achievement in itself.

Another political fact affecting Batangas is that the election cycle for local officials may be one of the obstacles in formulating long-term LGU capacity-building programs. For example, in the Philippines, local governments learn how to govern in the first year of office, develop projects the next year, but then abandon implementation thereafter as political campaigning commences during the third year.

7. What else might the Batangas LGU try?

Expand the parameters of the functions devolved—It has been observed that the functions devolved to LGUs by DENR are not substantial in terms of authority and geographical extent. This fact stems from a perception by national government officials that LGUs are not yet prepared to take on greater responsibilities for planning and management of the environment and natural resources. With increased capabilities LGUs can better put into effect the concept of "continuing devolution."

The DENR has devolved certain environmental management functions to LGUs in accordance to Section 17 of the LGC, which provides that the enforcement of laws is devolved to provinces and cities, while implementation of projects and activities is devolved to municipalities and cities. The functions devolved to LGUs in Environment Management include:

- Enforcement of certain pollution control and environmental protection laws, rules and regulations,
- Implementation of solid waste disposal and other environmental management systems and services related to general hygiene and sanitation such as sewage and household waste disposal,
- Abatement of noise and other forms of nuisance as defined by law, and
- Implementation of Cease and Desist Orders issued by the Pollution Adjudication Board.

These functions do not include broad authorities to enforce environmental requirements or implementation of all relevant environmental programs in the region.

Upgrade city land use plans to integrate environmental concerns—An environmentally friendly land use plan can serve as the basis for upgrading existing city and municipal zoning ordinances and other local development control regulations to prevent environmental degradation. This is critical to implementation of market-based instruments and will become a potent tool for strategic environmental management, serving as the basis for streamlining the environment impact system (EIS) and phasing in fines for pollution infractions. For example, EISs are required for land use impacts, and pollution charges could be apportioned based on zoning of pollution receptor areas (rivers, lakes). In addition, an advantage of incorporating environment in land use plans and follow-on zoning ordinances is that it would speed up processing of environmental clearances for future projects.

It is important for DENR to be involved in land use planning because this allows the proposed land use plan to be subjected to a formal environmental impact assessment. By getting involved in land use planning, local development plans and DENR policy matters are tackled early. Critical concerns are addressed, such as intensity of development, type of industries to be allowed, location of toxic waste disposal, and whether transportation plans are consistent with planned development. This collaborative process could be a win-win situation for LGUs and the DENR.

8. What existing national policies make it difficult for LGUs to take action?

The Local Government Code, devolving some environmental functions to local authorities, represents step in the right direction. Unfortunately, this law contains limitations that hinder true devolution.

9. What could national government do to encourage or make it possible for LGUs to take action?

Actions that could be taken under the auspices of the Department of Environment and Natural Resources (DENR) include:

1. Widen access of the LGUs to participate in policy-making,
2. Provide incentives to LGUs in the enforcement of laws,
3. Coordinate with the DILG on capacity-building and technology transfer to benefit local government, and
4. Amend Department Administrative Order 96-37 to accommodate LGU participation in the review process of EIAs and IEEs for projects or activities within the jurisdiction of the LGU concerned.

Actions that could be taken under the auspices of the Department of Interior and Local Government include:

1. In coordination with the DENR and with NEDA, assist LGUs in obtaining funding for environmental projects, and
2. Enhance the capability of the Regional Development Councils to include environmental issues.

Actions that could be taken by the Philippines Congress include:

1. Review Section 17 of the LGC to make the law compatible with the concept of decentralization. For example, Section 17 provides that "LGUs shall be subject to the continuing supervision, control and review by the DENR." This requirement could be modified to facilitate more effective devolution of authority.

Under the rubric of a comprehensive regional approach, the Batangas Bay Demonstration Project and other initiatives illustrate how regional approaches to environmental management spur CPC activities.

Distillery Wastes Applied As Crop Fertilizer

An initiative of SEARCA (Southeast Asia Regional Center for Graduate Study and Research in Agriculture) for distillery firms in Batangas uses treated distillery waste as inputs to agricultural production activities. Distillery waste management systems salvage treated wastewater for use as irrigation for crops such as sugarcane and rice and utilize process sludge as a soil enhancer. Although this example of Cleaner Production is limited to distillery wastes, it could be applied to city services such as wastewater treatment and other sanitation services.

Critical elements for successful implementation of CPC strategies exist in Batangas. The regional plan offers a framework for action. There is a history of stakeholder involvement. Commitment from top government officials exists. The next step is to modify certain SEMP implementation strategies to transform city services into sustainable practices.

The combination of urban and rural areas in the Batangas Bay region increases the complexity of solving environmental management challenges. Urban needs and perspectives often differ from stakeholders in rural areas dominated by agricultural industries. Effective CPC strategies in this region must account for potentially conflicting perspectives, providing workable mechanisms for mediating differences. By uniting under a single vision, a region can transform itself into a living embodiment of sustainability.

Cebu, Philippines: Decentralization Promotes Cleaner Practices for Cities

A common theme of environmental protection in developed countries is the presence of strong centralized regulatory authority. The European Union takes this approach one step further by extending such authorities over all Member nations. Centralizing environmental authority generally ensures a reasonable level of consistency from one jurisdiction to another. However, the very strength of centralized regulation—consistent application of regulatory authority—can remove flexibility, which is often needed to develop specific sustainable solutions for regions and cities with unique situations.

The Philippines, by contrast, gave city governments broad authority to manage their own affairs in 1991, allowing sustainable development policies to be tailored to address local needs. Cebu, the fifth largest city in the Philippines and the administrative and commercial center of the Central Visayas region, is learning to utilize the policy flexibility available with greater local authority. For example, the Philippines Department of Environment and Natural Resources (DENR) enforces air and water pollution standards for industry. However, the Cebu City Mayor signs the yearly business licenses for all businesses within the City limits and has authority to withhold such licenses for environmental impact reasons. Although limited by the technical and oversight capacity of the City staff, the licensing process can be used locally to enforce select environmental standards.

Industry-Government Cooperation Leads to Cleaner Practices for Cities in The Philippines

The Shemberg Corporation has its main plant in Mandaue City. The firm expects to close this plant down in 10-15 years because residential encroachment increases land values, and the facility is an unattractive neighbor. The firm plans to relocate operations to a new plant at Carmen to the north. This facility will be built to far higher environmental and efficiency standards. In this example, a sustainable solution tailored to the needs of local areas was possible due to the broad authority given to local communities. The Shemberg Corporation plant relocation is a win-win for Shemberg, Mandaue and Carmen residents.

Local government officials in the Philippines utilize a variety of mechanisms to promote sustainable development and improve livability in urban centers. Cebu City government discourages industry from locating within City boundaries, instead encouraging industry to locate in the nearby Cities of Mandaue and Lapu Lapu and the five municipalities that make up the Cebu Metropolitan area. There is no single unit of government that administers this entire area, requiring cooperation among various local authorities and business leaders to improve environmental conditions. In fact,

legislation is required to empower a government authority to develop and implement any comprehensive plan governing environmental performance and economic development in the region. Decentralization sometimes forces potentially conflicting parties to cooperate to achieve sustainable goals, such as implementation of CPC strategies.

Our research identified several key environmental challenges for the Cebu region including: (1) the need for a comprehensive wastewater treatment system; (2) limitations on water consumption and industrial usage; (3) solid waste management driven by landfill limitations; and (4) protection of vital coastal resources from overuse and exploitation. Opportunities for introducing CPC strategies designed to meet Cebu's needs include the following:

- **Wastewater treatment**—Because funding for comprehensive infrastructure solutions is limited, interim solutions are needed, such as building codes requiring adequate treatment of wastes from developments. This points to the need for low cost, efficient and easily maintained small plants. *These plants could use treated wastewater for irrigation of nearby agricultural areas, reducing the need for fertilizers.*
- **Watershed management**—Regional approaches to watershed management, such as the Butuanon River Watershed Project, promote common solutions to managing the impacts of effluents discharged from industrial plants. *This approach utilizes the advantages of decentralized authority to develop a planning process tailored to meet regional needs.*
- **Solid Waste Management**—The City of Cebu has the only sanitary landfill in the Philippines. However, this landfill can handle only about 70 percent of the wastes sent there due to equipment limitations. *One possible strategy is to acquire new waste management technology in light of the national ban on incineration. Another possibility is the development of recycling centers in Cebu and other urban areas to diminish the need for additional landfill capacity.*

These opportunities for introducing Cleaner Practices for Cities in Cebu represent specific strategies designed to promote sustainability in the region. Some of the critical elements for success we observed in Cebu include: support at the highest levels, involvement of most stakeholders, comprehensive regional planning efforts, and a focused implementation strategy. Perhaps, stakeholders could be involved in addressing key issues such as solid waste management alternatives. These possible strategies also can have ripple affects by encouraging Cebu stakeholders to be more supportive of sustainable practices in general.

Linz, Austria—Citizen Participation in the Siting of Waste Facilities

In response to public opposition to plans for a local hazardous waste incinerator, the City of Linz, Austria, established a Citizen Participation Program in cooperation with a company recruited to develop a waste management technology for the city. The purpose of the Program was to involve the public in evaluating technologies that could be used to manage hazardous wastes locally, rather than exporting them to other communities and countries. The Citizen Participation Program brought differing interests together in open, productive discussions. Local residents and environmental organizations developed a better relationship with local government and industry. For example, the process uncovered the fact that Public opposition to the originally planned incinerator was based on lack of information about technical details and possible emissions. The City views the Program as part of a learning process and plans to similarly involve citizens in decision-making in the future so that active participation from the public becomes a matter of course in Linz.

Rayong, Thailand: Industrial Estates— Cleaner Practices for Cities Platforms

Western societies historically embrace centralized authority for cultural, institutional and practical reasons. Environmental policies in these societies often begin as national initiatives that may devolve select authority to states, provinces, cities and municipalities. In the U.S., many national environmental policies establish minimum standards, giving states authority to exceed these standards to address unique needs. Without minimum standards for certain environmental policies, devolving authority to local governments opens up the potential for applying differing standards to meet competing political or economic goals. In light of this history, centralized government authority in combination with the existence of concentrated industrial centers in Asia may offer unique opportunities to introduce targeted CPC strategies.

The Nakon of Rayong in Thailand is the administrative and commercial center of the Province of Rayong in the southeast of Thailand with a population of about 55,000 and a metropolitan population of 150,000. Rayong is surrounded by large industrial estates most of which are controlled by the Industrial Estate Authority of Thailand (IEAT).

Industrial Estate Authority of Thailand (IEAT)

The Province of Rayong is not as densely populated as the immediate surroundings of Bangkok. It consists of urban residential and commercial centers both large and small with little industry visible. Huge industrial estates are set apart from the urban centers and are dominated by heavy industries such as chemicals and steel. Most of these come under the jurisdiction of the Industrial Estates Authority of Thailand (IEAT), a national government organization over which local governments have little authority. In this system, CPC strategies need to utilize the strengths of centralized authority.

In contrast to the Cebu example, Rayong enjoys little autonomy in decision-making and resource allocation. Controlling more than 90 percent of funds, the central Thai government exerts a high level of control over what projects and activities are funded and which provinces or municipalities receive funds for capital-intensive projects, such as wastewater collection and treatment. As a result, local initiatives demand national support, restricting the ability of local governments in Thailand to plan and implement development projects or introduce new environmental services.

In light of the limitations imposed on local governments in Thailand, the existence of industrial estates separate from urban centers represents an opportunity for introducing

CPC strategies by harnessing the strengths of centralized government authority. For example, tax breaks could be offered to encourage transformation of industrial estates to eco-industrial parks. Additionally regulatory flexibility and even seed capital could be channeled to industrial estates that convert to sustainable eco-parks, providing additional incentive to make the transition. Eco-parks utilize CP strategies to reduce wastes, promote recycling and approach closed-loop industrial systems. The promise of increased efficiencies could attract outside investment, funding plant and equipment retrofits at existing industrial estates.

Challenges to address include gaining both local and national support for introducing a new approach to industrial operations, attracting outside funding for infrastructure and technology changes, and convincing industry to make necessary short-term investments. Since there exists political support for introducing new CPC strategies, the challenge of gaining national support may be limited to committing resources. While no new legislative or regulatory changes may be necessary, regulatory approvals at a minimum are needed. Local government officials may have very different needs or interests, apart from the national government. Identifying these needs and cultivating local government support is necessary for success. Attracting outside investment may largely depend on the economics of a given project, regional stability, and future economic prospects in the region. Seed money and financing from development banks can overcome some of these potential hurdles. Gaining industry support will depend on a variety of bottom-line business considerations associated with a given project.

Piggery Eco-Industrial Park—Bangkok, Thailand

Sponsored by the Thai Government, the Piggery Eco-Park utilizes an integrated approach to waste management, incorporating Cleaner Production, waste minimization, integrated farming systems, recycling and resource conservation strategies. This park offers a model for further analysis that could potentially be extended to Rayong and other industrial centers in Asia.

See www.usaen.org for more information.

VI. CONCLUSIONS AND RECOMMENDATIONS

The case studies each identified critical elements present for successful implementation of Cleaner Practices for Cities. Without these elements the prospects for success would be very limited. A dynamic that could override the need for critical elements to be present is the ever-present possibility of an environmental crisis. Events like the chemical plant explosion in Bhopal, India, have both immediate and lasting effects that can provide overnight impetus for change. In the absence of crisis, CPC implementation strategies should begin with identification of urban areas where the critical elements for success may exist. Cebu, Rayong and Batangas each illustrate urban areas offering opportunities for successful implementation of CPC strategies in Asia. Batangas Bay in particular offers a good starting point for assessing the effectiveness of introducing CPC strategies in select Asian cities.

Looking broadly at these case studies, one of the best opportunities for establishing a CPC program utilizes the international environmental evaluation performance (EPE) standard ISO 14031. This does not require the complications and expense of becoming certified to ISO 14001 but can through the selection of appropriate environmental performance indicators (EPI), and measuring continual improvement against them, demonstrate to the public that successful action is being taken.

The City of Seattle, Washington, in the United States adheres to ISO 14031 without having gained certification. Interestingly, Seattle mirrors the City of Cebu in population, as a major port, and in its role as the commercial center of the Pacific Northwest. Seattle is also a sister city to Cebu. One approach might be for Cebu to organize a workshop involving the mayors of Cebu and other Asian cities. Representatives of Seattle would be invited to participate and present their views on Seattle's EPE program. The goal of the workshop could be to develop an action plan for implementation in Cebu, drawn up by workshop facilitators and approved by participants before closure. A follow up meeting would be organized sometime later to allow municipalities to present action plans and exchange experiences. The continuation of the program would be dependent on the success of the initial workshops and the availability of funding.

One of the common links in the case studies discussed in the previous section is the notion of stakeholders working cooperatively towards a common goal. Differences among stakeholder perceptions of a common vision are typically ameliorated through effective communications mechanisms or incentives. All efforts in these examples highlight the importance of balancing the interests of multiple stakeholders to achieve a sustainable result.

Another important lesson demonstrates the need to develop strategies tailored to differing institutional and regulatory frameworks. Rayong, for example, highlights strategies that take advantage of centralized governmental authorities; while Cebu and Batangas illustrate the strengths of applying CPC approaches designed for countries

with decentralized authorities. As the Batanagas case study illustrates, though, decentralizing authority to LGUs may require an expansion of local authority to truly offer a decentralized model. Institutional and regulatory frameworks vary widely across Asia, suggesting that the most effective CPC approaches will account for these differences by harnessing the inherent strengths of any given framework.

Developing an approach for integrating CPC strategies throughout Asia must be done in a stepwise process and with great sensitivity to the many interests impacted by proposed changes. Remembering the critical elements for success need to be present, the following steps offer one approach to introducing CPC strategies in Asia:

- **Step One:** Change attitudes and minimize conflict through development of a common understanding of CPC goals and strategies. Until all affected stakeholders can work cooperatively to develop a common understanding of concerns, needs and interests, few obstacles to achieving sustainability can be overcome. An action plan for developing a common understanding could be developed and implemented. This effort will act to unite stakeholders over a common goal.
- **Step Two:** Identify pockets of opportunity, or low-hanging fruit, and implement focused strategies designed to build credibility and support for instituting CP strategies on a wider scale in Asia. The most effective environmental policies evolve from implementing initiatives that introduce new approaches on a small-scale. Pilot programs, experiments at single facilities and innovative urban programs with narrow objectives offer tools to build more comprehensive plans. Focused approaches also offer more easily measured results.
- **Step Three:** Develop partnerships among multiple stakeholders for short-and long-term efforts designed to build consensus on specific issues or policies and to implement innovative projects. Developing goodwill among stakeholders can propel challenging initiatives a long way.
- **Step Four:** Develop a CPC marketing approach designed to bring investors and industry to the table by looking at the long-term economics of projects and the comparative advantages to be gained from introducing sustainable approaches into existing industrial activities. This approach also helps to attract project financing and development bank assistance. This step ties economic and environmental gains together.

Examining all of the lessons learned discussed in this study, we conclude that opportunities abound to implement sustainable practices. The conceptual framework offered by industrial ecology and natural capitalism help to pave the way for implementing new Cleaner Practices for Cities strategies. While it is clear that this type of conceptual thinking may not be mainstream, the impending environmental and economic crisis we face in the absence of concerted action should urge us to make the leap of faith necessary to establish a new model for sustainable cities. This effort in combination with other ADB and USAEP efforts represent a meaningful step in the right direction. Careful study and planning must precipitate action. Action can lead to

sustainable results. In light of the impending global environmental crisis we face, the onus is on every nation to explore opportunities for sustainability.

VII. APPENDICES: DETAILED CASE STUDY INFORMATION

1.0 CEBU, THE PHILIPPINES

The City of Cebu is the fifth largest city in the Philippines and is the major administrative and commercial center of the Central Visayas. With a population of 750,000, it has little industry in the area. In fact, City government discourages industry from locating within City boundaries, instead encouraging industry to locate in the nearby Cities of Mandaue and Lapu Lapu and the five municipalities that make up the Cebu Metropolitan area. There is currently no metropolitan authority, and the city is independent of the Province of Cebu, which includes the remainder of the Island of Cebu as well as the Island of Mactan. It is thus administratively separated from its industrial centers.

1.1 Regional View

The local governments with responsibility for the Islands of Cebu and Mactan are the Province of Cebu and the City of Cebu. The Province includes the chartered cities of Mandaue and Lapu Lapu as well as a number of municipalities; while the City of Cebu is independent. The cities of Cebu, Mandaue and Lapu Lapu together with five municipalities created the Metro Cebu Development Projects Office as a joint policy making body.

The Islands of Cebu and Mactan appear to be developing into a single metropolis in the future. The extent to which this is part of a comprehensive master plan is not clear from this research. There is no unit of government that administers this entire area. The Province of Cebu covers the islands with the exception of the City of Cebu, which has a separate governing charter. The National Economic Development Authority (NEDA) is reported to have produced a master plan for the development of the islands. There is a Metro Cebu Development Projects Office covering the cities of Cebu, Mandaue and Lapu Lapu plus five smaller municipalities, but it does not include the whole island of Cebu. There is consideration being given to the creation of a Metro Cebu Authority similar to the Metro Manila Authority. However, legislation has not yet been prepared to create this entity and its powers are unknown. The Cebu Chamber of Commerce and Industry has members throughout the two islands and the Cebu Investment Promotion Center (CIPC) has been established with membership that includes the provincial and local governments, industry and a private university covering the same area.

The Cebu Chamber of Commerce reports that there is a deliberate policy of decentralization of development decision-making throughout the island in order to avoid the type of urban congestion being experienced in Manila. The construction of new infrastructure is being coordinated with this policy in mind. NEDA appears to be the only body with the authority to develop such a plan but there appears to be little

consensus on the appropriateness of a comprehensive plan, leading to little cooperation among local governments in its implementation.

The following example of decision-making that impacts this Region highlights the broad vision required to take advantage of opportunities for implementing CP in urban areas. The Shemberg Corporation has its main plant in Mandaue City. The firm expects to close this plant down in 10-15 years because residential encroachment increases land values, and the facility is an unattractive neighbor. In response, the firm plans to expand an existing new plant at Carmen to the north on the island. This will be built to far higher environmental and efficiency standards. With a comprehensive, regional planning model in place, such approaches to plant facility siting and environmental performance might be replicated routinely.

The City of Cebu has relatively little industry and currently discourages heavy industry from establishing there, instead encouraging commercial activities such as banks to locate in Cebu. When the Southern Reclamation Area, a P2.4- 3 billion, 300 ha (750 acre) project funded by OECF is completed, the City will encourage the establishment of light non-water consuming industries within City borders (e.g., assembly plants). Despite the dearth of heavy industries, the city has many municipal operations to which CP approaches may be applied.

1.2 Statistics

National statistical data is largely collected at a regional level with limited data at a provincial or city level. The islands of Cebu and Mactan have an area of 5,000 sq. km and a current population of about 3 million⁹ giving a population density of 600 per sq. km. The Metro Cebu area has a population of about 1.5 million, whereas the City of Cebu has a population of about 750,000¹⁰. The 1994 per capita GDP for the Central Visayas Region of which Cebu is part was P22,138 compared to the national average of P25,175 and Manila, P62,006¹¹. In 1998, the total labor force of Cebu Island was 1.273 million of which 1.091 million were employed, yielding an unemployment rate of 14.3 percent¹².

1.3 Local Government Unit (LGU) Funding

⁹1990 census 2.646 million (source - 1995 Philippine Statistical Yearbook)

¹⁰1990 census 610 thousand making it the fifth largest city in the country after Quezon, Manila, Davao and Caloocan. Percent change from 1980 - 24.5 percent or an annual rate of 2.2 percent. (Source - 1995 Philippine Statistical Yearbook)

¹¹1995 prices, Cebu represents about 58 percent of the population of the Central Visayas, data is unavailable at a lower level of disaggregation. (Source - 1995 Philippine Statistical Yearbook)

¹²CIPC Economic Fact Book 1999

The central government in the Philippines allocates 40 percent of the internal revenue tax to local governments on a fixed share basis. Cebu receives about 29 percent of its income in this manner, the remainder through local taxes and fees. Its total income amounts to about \$50 per capita. It receives other funds for specific projects through central government backed loans. Local governments raise revenue using the following tools:

Provinces:

- Real property tax,
- Tax on transfer of real property ownership,
- Tax on business of printing and publication,
- Franchise tax,
- Sand and gravel tax,
- Professional tax,
- Amusement tax on admission, and
- Annual fixed tax per delivery truck or van of manufacturers or producers of or dealers in certain products.

Municipalities:

- Tax on business,
- Fees and charges,
- Fishery rental or fees and charges,
- Fees for sealing and licensing of weights and measures, and Community.

Cities may levy and collect any of the taxes, fees and other impositions that a province or municipality may levy and collect.

LGUs also get a 40 percent share of the national internal revenue tax, which is known as the internal revenue allotment (IRA). IRAs are distributed as follows:

- Provinces - 23 percent
- Cities - 23 percent
- Municipalities - 34 percent
- Barangays - 20 percent

The share of each province, city and municipality is based on the following:

- Population - 50 percent
- Land area - 25 percent
- Equal sharing - 25 percent

There has been a tendency for the raising of funds from local sources to decrease as a proportion of total income. In 1992, the first year after enacting the local government code, locally raised funds represented 42.76 percent of total income of LGUs in contrast to only 29.84 percent in 1995. However, both total income and locally raised funds increased significantly. Total income of LGUs increased from 27,703.5 million pesos in 1992 to 77,006.9 million pesos in 1995 while locally raised funds increased from 11,846.6 million pesos to 22,976.9 million pesos¹³. The view was expressed that the inability of LGUs to collect more funds locally was due to the unwillingness of local citizens to be subject to a higher level of taxation and fees. The key to changing this is to convince the public that any increase in taxes will result in an improved quality of life and level of services they enjoy. This issue is common to all democratic societies including the U.S. It was further suggested that the experience of US LGUs in convincing citizens to pay local taxes would be of value in Cebu.

1.4 Key Environmental Issues

The following are environmental issues that were identified as a result of meetings with local officials and others.

Water Supply is a local constraint. There are reports of salt-water intrusion into the groundwater table as a result of over pumping in some areas. Because of the limitations of the water supply, industrial development will be limited to non-water consuming industries, when the Southern Reclamation Area is completed. Water conservation is therefore an area of potential interest. (See Section ___ for a description of the local water utility.)

Wastewater Treatment is limited to a small plant servicing part of the northern reclamation area, small plants serving some business parks in the City of Cebu and individual industrial treatment plants at some factories. Standard household plumbing feeds blackwaters¹⁴ to septic tanks while greywaters¹⁵ are discharged to storm drains or streams. A new building ordinance requires rainmakers to be collected and stored. This will make future installation of a sewage collection system easier. A US consulting firm proposes to undertake a comprehensive study for a sewage collection and treatment system for the Cities of Cebu and Mandaue. However, neither city is likely to be in a position to fund the construction of a comprehensive system in the foreseeable future. Interim solutions are needed such as building codes requiring adequate treatment of wastes from developments. This points to the need for low cost, efficient and easily maintained small plants.

¹³*Local Government in Asia and the Pacific - Country Paper: Philippines*, ESCAP 1999 available on the Internet at www.unescap.org/huset/lgstudy/country/philippines/philippines.htm

¹⁴Wastes from toilets

¹⁵Waters from baths, showers, kitchens, etc.

There are problems of effluents discharged from industrial plants. The Butuanon River Watershed Project was established with support from the US Environmental Protection Agency to develop a common approach for industries discharging into this watershed. The Shemberg Corporation in Mandaue City is located in the watershed and is constructing its own wastewater treatment plant but other industries claim to be unable to afford the cost.

Solid Wastes are a major issue. It was reported that the City of Cebu has the only sanitary landfill in the Philippines. However, it was further reported that this landfill provides daily coverage of only about 70 percent of the wastes due to equipment limitations. An incinerator was constructed at the City of Cebu landfill for medical wastes but has not been given a permit to operate due a national ban on new incinerators. As a result, there is no satisfactory way of disposing of medical wastes at this time.

Air Pollution is not considered a major issue at this time due a favorable climate and winds and is certainly not as noticeable as in Manila.

Coastal Resources - The coast is a prime resource for tourism, fishing and natural beauty. It needs protection from both aesthetic and physical pollution.

1.5 Cebu Municipal Functions

The Cebu City government carries out a variety of traditional municipal functions. These include, among others, environmental services (solid waste and street cleaning), maintenance of roads, sidewalks and drainage, limited wastewater treatment, traffic management, and some health and social services. The workforce is over 5,000.

The management structure is divided into 19 departments, listed below:

- Planning and Development
- Budget Office
- Office of the City Legal Advisor
- City Treasurer
- City Assessor
- Management Information and Computer Services
- Veterinary Medicine and Fisheries
- City Accountant
- Manpower and Development
- Health Department
- Public Services
- Engineering and Public Works
- Social Welfare Services and Development
- Agriculture

- General Services
- Superintendent of Schools
- Fiscal Services
- Register of Deeds
- Civil Register

Several other functions are directly under the Office of the Mayor. These functions include a fairly sophisticated Geographic Information Office developed with support from USAID. The City Administrator and Legal Counsel work at the pleasure of the Mayor, the former carrying out some overall oversight functions of the administrative structure.

1.6 Financial and Bureaucratic Factors

Form of Government. The Mayor serves in an executive capacity as, essentially, the chief operating officer of the government. The City Council, which is elected every three years, consists of 16 councilors. The city is divided into two wards for electoral purposes with each sending a slate of eight councilors to serve on the Council. Only the mayor and the vice mayor are elected at large from the entire city populace.

Each councilor heads a committee. The committees, following the instruction of the mayor, generally include representatives of the private and NGO sectors. Some of these committees are quite active with weekly meetings. The councilor, who serves as committee chair, is considered to be acting on behalf of the mayor.

The city's budget in 1998 was P3.69 billion. Less than half of this, P1.47 billion, consisted of actual revenue. The balance consisted of particular projects funded by the central government, donor agencies, or through bank credit. Of the revenue that was raised, 29 percent was from the Internal Revenue Allotment¹⁶ from the central government. As a result the actual revenue raised by the City, was barely over P1 billion, but the proportion of moneys raised locally is higher than the national average. Of this locally raised revenue, the largest sources were business and property taxes.

Under legislation enacted in 1991, city governments in the Philippines have broad authority to manage their own affairs. Of particular note, there are few limitations on the ability of cities to raise revenue for services, nor to access, if they are able, capital for longer-term development projects. The oversight from the Department of the Interior has been limited. The effects of this delegation of authority have been gradual and of course are highly varied from one city to another. Despite this movement toward decentralization, several limitations are noted here:

¹⁶For a description of LGU funding in the Philippines see Section 4.1.

Financial Resources. As noted above, the City continues to be highly dependent on other than own-source revenues to finance services. When transfers and external project financing are taken out of the equation, perhaps only 30 percent of city expenditures are funded through the discretionary raising of revenue from the citizenry.

Underinvestment in Infrastructure. As the City has grown in population, as well as in affluence, the poor condition of the infrastructure has become more glaring. For example, with the exception of a largely industrial area, there is no wastewater treatment plant for Cebu City.

Sustainable Growth. Cebu City continues to grow at an accelerated rate due to natural increase and in-migration. Contamination of the water supply (which is not managed by the City government directly) presents a crisis due to salt-water infiltration to the largely subsurface system and no clear schedule for developing other water sources. The only solid waste landfill is approaching capacity within the next few years.

1.7 Cebu City Environmental Services

As noted the key environmental services provided by the City government are in the areas of solid waste and maintenance of the storm and limited wastewater infrastructure. In addition, the City has some authority over watershed protection, because settlement and uncontrolled use of the rivers for sanitation are within the jurisdiction of City planning and public health authorities.

The Philippines Department of Environment and Natural Resources (DENR) enforces air and water pollution standards for industry. However, the City Mayor signs the yearly business licenses for all businesses within the City limits and has authority to withhold such licenses for environmental impact reasons. The use of the licensing process to enforce at least some environmental standards is limited by the technical and oversight capacity of the City staff.

Cebu City Multi-Sectoral Environmental Protection Committee. This Council committee, under the direction of Councilor Rosito, has over 25 members, including city government staff, central government staff, representatives of NGOs, academics, and concerned citizens. It has five subcommittees:

- Community Participation and Linkages
- Environmental Infrastructure and Technology Applications
- Environmental Policies and Laws
- Environmental Regulations and Enforcement
- Information, Communication, and Education

The Committee meets weekly to exchange information, plan various initiatives, and review progress of ongoing efforts.

Cleanliness Action Team. This Council-sponsored committee has representation from public, private, and industry groups. It is primarily concerned with enforcement of City Ordinance 1361, which deals with littering and waste disposal. It is looking at new educational and public information approaches to raise compliance and overall consciousness about urban waste issues.

Sister Cities. The city has sister programs with 17 cities in North and South America, Asia and Europe. These include Salinas City, CA; Seattle, WA and Honolulu, Hawaii in the US; Guam, US Trust Territory; Kaohsiung, Taiwan and Yosu, South Korea. The full list is attached as Appendix 1. It is not clear what activities are sponsored by these programs and to what extent they could be relevant to the case study.

1.8 Other Cebu Stakeholders

Cebu Chamber of Commerce and Industry: The Cebu Chamber of Commerce and Industry has members throughout the islands of Cebu and Mactan and therefore is interested in the whole island's development. The Chamber represents the private commercial and industrial sector only and not government or the general public.

Cebu Investment Promotion Council: The Cebu Investment Promotion Council is the only organization identified that represents both local and provincial governments as well as the private sector. Its function, as its name implies, is to promote investments in the region, which includes the Province and City of Cebu. As an example of their activities, they have developed sophisticated promotional materials including a video.

Cebu United for Sustainable Water (CUSW): This is an umbrella NGO organized around issues concerning the development of a sustainable system for potable water in the face of deteriorating service, population growth, and threats to the major watersheds. With this orientation, CUSW and its constituent organizations are active in a range of environmental issues.

Metropolitan Cebu Water District: The Metropolitan Cebu Water District (MCWD) is a state-owned corporation, providing water supply to the Cebu Metropolitan area. It currently can service only 39 percent of the water needs of its service area, about 330 thousand cubic meters per day, due to both limitations of its water supply sources and the inadequacy of its distribution system. Daily demand is projected to increase at a rate of 15 percent per year thereby aggravating the situation. The balance of supply is from private wells and vendors. Its water losses are in the order of 36-37 percent, which are better than average for developing countries¹⁷. Rates, which go up to 35.22

¹⁷Water losses include both leakage and illegal connections. Water losses in the order of 50 percent are common in developing countries.

pesos/m³ for industrial use, are relatively high. While on the one hand, high rates represent an incentive to conserve water. High rates encourage installation of private wells that deplete the water table. The Water District intends to rehabilitate and develop the 22,000 ha Mananga- Kolkot-Lusaran watershed close to the City of Cebu to produce 263,000 to 341,000 cubic meters per day under a BOT (SPELL THIS OUT) contract. Another planned public-private partnership BOT contract is intended to improve and expand the distribution system.

2.0 RAYONG, THAILAND

The Nakon of Rayong is the administrative and commercial center of the Province of Rayong in the southeast of Thailand with a population of about 55,000. It is surrounded by a number of tambons (small municipalities) that comprise the City of Rayong with a total population of about 150,000. Whereas the Nakon has little industry, it is surrounded by large industrial estates most of which are controlled by the Industrial Estate Authority of Thailand (IEAT), a national government organization over which local governments have little authority.

2.1 Regional View

The Province of Rayong is not as densely populated as the immediate surroundings of Bangkok. It consists of urban residential and commercial centers both large and small with little industry visible. Huge industrial estates are set apart from the urban centers and are dominated by heavy industries such as chemicals and steel. Most of these come under the jurisdiction of the Industrial Estates Authority of Thailand (IEAT).

The City of Rayong is the administrative and commercial center of the Province of Rayong, and the major LGU in the area situated in the southeast of Thailand. Rayong City has recently been upgraded from a “muang” to a “nakon” as its population (about 55,000) exceeds 50,000 and it meets certain tests¹⁸. As a result, its system of government is due to change from a mayor elected by the council to a directly elected mayor and an election was due to be held in December 1999. The city has a total population of about 150,000 and therefore the Nakon represents about a third of the city’s population, the remainder being divided among a number of tambons with populations of less than 10,000.

¹⁸Local urban government outside of Bangkok, and excepting Pattaya, is established at three levels: Tambon with a population greater than 7,000, population density of 1,500 people/km², and revenue of B12,000,000/year; Muang with a population greater than 10,000, population density of 3,000 people/km², and revenue compatible with its responsibility; and Nakon with a population greater than 50,000, population density of 3,000 people/km², revenue compatible with its responsibility (*Local Government in Asia and the Pacific - A Comparative Study, Country paper: Thailand*, ESCAP 1999, available on the Internet at: www.unescap.org/lgstudy/country/thailand/thai.htm).

2.2 LGU Funding

Local governments in Thailand also receive funds from central governments but the system of allocation favors Bangkok and other major cities and leaves little for smaller municipalities. As a result municipalities in Thailand scarcely have sufficient funds to operate essential services, let alone improve them. Excepting a few with the financial standing to borrow on the open market, they are entirely dependent on central government funding of environmental improvement projects.

All units of local government draw their revenues from four main sources: tax collection, grants by central government, property and enterprises under their control and loans. In order to be able to obtain loans the local finances have to be sufficient to be able to guarantee re-payment. Thus Bangkok, Pattaya and the municipality of Chiang Mai are the few places able to borrow on the open market¹⁹.

Local taxes include:

- Real estate, signboard and slaughtering taxes,
- Local additions to the value added tax collected by the central government,
- Specific business taxes,
- Road and vehicle taxes collected by central government but re-allocated to LGUs less a 5 percent service fee, and
- Fees, licenses and fines²⁰.

In addition they receive revenues from properties, public utilities and local government enterprises.

They also receive grants, loans and subsidies from the central government. The distribution of central government funds has been on an inequitable basis. Bangkok receives 60 percent of the distribution and the major municipalities such as Chiang Mai and Hat Yai receive a large proportion of the balance²¹.

Collection is often inefficient. For example, fees for garbage disposal are collected house to house. Household holders will find excuses not to pay and collectors pocket a large portion of the moneys they receive. In Chiang Mai, it was estimated that the municipality collected 10 percent of the fees due to them²².

¹⁹Ibid

²⁰Ibid

²¹Ibid

²²Based on the author's experience working on the Chiang Mai Planning Project

With LGU revenues averaging 1.36 percent of GDP in 1992—about 8 percent of the revenues collected by central government²³--they are generally inadequate to provide basic services, let alone improved services. Local governments are therefore severely restricted in their capacity to plan and implement development projects and additional services. Controlling more than 90 percent of funds, the central government is able to exert a high level of control both in terms of what projects and activities are to be funded as well as which provinces and municipalities receive funds for capital intensive projects such as wastewater collection and treatment.

2.3 Devolution

An opportunity for providing a more equitable fund distribution process comes from devolving legal responsibilities to local governments. At the time of this field research, a series of laws are planned for passage by Parliament in late 1999. They include:

1. A "Law on Decentralization Planning and Process";
2. A law on personnel management at the local government level; and,
3. A law on the overall structure and relative powers of the various levels of government in Thailand. The laws will establish a National Decentralization Committee to monitor and evaluate the decentralization process. It is planned that the Committee will have equal representation from the central government, local governments, and other parties (e.g., academics, NGOs). The impacts of these laws have yet to be determined.

2.4 Rayong Municipal Functions

The Nakon of Rayong is organized into eight departments: 1) City Clerk Office, 2) Technical and Planning, 3) Finance, 4) Public Works, 5) Public Health and Environment, 6) Education, 7) Public Welfare, and 8) Water Supply. Management level employees are actually employees of the central government and can be reassigned at central government discretion.

The statutory functions of local government in Thailand are:

- Maintenance of law and order,
- Provision of public transport,
- Provision of sanitary services (water supply, waste disposal, sewage and drainage),
- Provision of fire engines,
- Prevention and control of communicable diseases,
- Provision of slaughterhouses,

²³ *Local Government in Asia and the Pacific - A Comparative Study, Country paper: Thailand*, ESCAP 1999

- Provision of welfare for mothers and children,
- Provision and maintenance of public recreation space and facilities, and
- Provision of primary education.

In addition, it may have certain discretionary functions including:

- Provision of market places, ports and ferry services,
- Provision of crematoriums,
- Provision and maintenance of hospitals,
- Provision of public utilities,
- Provision and maintenance of parks, zoos and recreation areas as well as sports facilities,
- Provision of vocational training,
- Promotion of citizens' occupation,
- Improvement of slum dwellings, and
- Maintaining government enterprises.

2.5 Rayong Environmental services

Solid Waste: A major environmental service provided by the Nakon of Rayong is solid waste collection and disposal. The Nakon operates a regular collection system for residential areas, markets, and business areas, typically collecting on a daily basis. Twelve (12) dump trucks are in operation, with 46 staff dedicated to solid waste operations. With funding from the central government, the Nakon's dump was upgraded two years ago to a partially lined and managed landfill. It takes in 85-90 tons of solid waste per day. There is a modest level of informal sorting of waste at the site for a recycling market.

Other smaller municipalities (tambons) are acutely aware of the inadequacies of their own solid waste operations. They are especially concerned about waste disposal. Most operate small open dumps. With the growth in population and increasing generation of waste per capita, these dumps are becoming more of a public health hazard. These municipalities are also concerned about the inefficiency and costs of current collection systems. In response, some have begun modest pilot efforts to encourage resident pre-sorting of wastes. The municipalities recently elevated from sanitary district to municipality status are especially sensitive to the need to upgrade waste disposal and cleansing services in order to meet the increased public expectations associated with this change in status.

Wastewater Treatment: A primary treatment²⁴ facility for a portion of the Nakon of Rayong was recently built. The facility went into operation at the end of the 1999. It is run by the central government, which financed it for the next two years. After this

²⁴Primary treatment removes about 30 percent only of the sewage wastes.

period, it is envisioned that the Nakon will take over management and must finance all recurrent costs. No decisions have yet been made on how additional revenue will be generated to cover these expenses. This is the only wastewater treatment plant in the Rayong Province, apart from the industrial wastewater treatment plant at the Map Ta Phut Industrial Estates. The Nakon has 16 staff involved in maintaining drainage and related facilities.

2.6 Other Environmental Activities

The Nakon government is intent on playing a more meaningful role on environmental issues. For example, the Nakon, through its role in primary education, works closely with private foundations to develop environmental education curricula. The Government also had one of its schools certified as ISO 9001.

The cities in the Province are looking at recycling and possible joint landfill projects. These cities increasingly raise issues with the Industrial Estates Authority of Thailand, such as industrial environmental impacts and environmental planning for housing development related to industrial employment growth. This coordination is primarily informal, but there clearly is an interest in better structuring dialogue among the municipalities, industry, and NGOs to stay abreast of environmental issues, and to develop collaboration approaches in some instances.

On a national level the LGUs of Thailand are becoming more involved in urban environmental issues. The mayor of Rayong Nakon chairs the Environment Committee of the Municipal League of Thailand. One of its current initiatives is to establish a Local Agenda 21 Center for Sustainable Cities. It is intended that this Center have a dedicated staff and the capacity to develop and manage training and exchanges, produce publications, and develop curricula.

The mayor also chairs a provincial environmental committee that includes representatives of the provincial government, LGUs, industry and NGOs. This committee was recently formed to address the environmental issues of the province.

3.0 BATANGAS BAY REGION, THE PHILIPPINES

Batangas is situated in the southwestern tip of Luzon, facing the South China Sea on the west, and bordered by Cavite in the north, Laguna in the northeast, Quezon in the east, and Verde Island passage in the south. Batangas is one of the five provinces within the CALABARZON (an acronym for provinces of Cavite- Laguna- Batangas-Rizal-Quezon) region, a major growth area in the Philippines.

The province of Batangas is resource-rich, spanning key coastal stretches with productive agricultural areas and extensive urban and rural settings. It has a total land

area of 316,561 hectares with two cities and 32 municipalities. Batangas City is the provincial capitol. The whole province is subdivided into four districts: District One is a sugar, aquaculture, and tourism area; District Two is an industrial area; District Three is a lakeshore area; and District Four is an agribusiness area.

3.1 Regional View

The Batangas Bay Region (BBR) comprises four coastal municipalities, one island municipality, nine interior municipalities, and two cities that have catchments draining into the Batangas Bay. The bay region is in the throes of industrialization, currently engaged in capital-intensive activities, including the construction of an international port for transshipment of raw and finished products, establishment of more industries along the bay coast, and settlement expansion amid an annual provincial growth rate of 2.38 per cent.

The entire region is an agricultural area, with 60 percent of its total land area devoted to crop production in 1992, dominated by sugarcane (23 percent), rice and corn (17 percent), coconuts, and other fruits and crops (20 percent). Major economic activities are concentrated in the coastal areas of the Batangas Bay. The CALABARZON and Batangas Provincial Government's industrialization strategy continues to fuel economic development of the Batangas Bay Region. Improvement of the physical and communications infrastructure and the completion of the port conversion in Batangas City into an international port positions the Region for transformation from an agricultural area into an agribusiness or industrial center in the 21st century.

Secondary forest covers 9 percent of the region and is almost nonexistent in the coastal areas. Other commercial activities include raising livestock, especially poultry and piggery, which combine to make the region a primary supplier of poultry and meat products in the Southern Tagalog region and Metro Manila. Fishponds, mainly brackishwater aquaculture concentrated in Batangas City, now occupy less than 100 hectares compared to more than 430 hectares in 1992, due to conversion to commercial, industrial and residential uses.

The coastline of Batangas Bay is currently used for industrial, residential, commercial, transportation, and recreational purposes. Over a hundred large industrial firms engaged in oil refinery, chemical, and textile manufacturing and food processing are located in the coastal area. Each of these facilities emits effluents or generates wastes that require preventive and control measures such as the use of cleaner production technologies, the installation of waste treatment facilities and effective enforcement of environmental laws. While firms own or operate waste treatment facilities utilizing sound production processes and a pool of technical personnel, there are reports of oil spills and waste discharges. Sand and gravel mining in riverbeds and open pit mining for silica in Mabini, which operate adjacent to the bay, accelerate destruction of local habitats and ecosystems.

The bay also receives an increasing number of cargo and passenger ships in the existing 22 ports, three of which are government-owned. In February 1997 the Philippine Ports Authority recorded 44,344 domestic and foreign ships that docked in various ports in the bay-the bulk of foreign ships docked at the Pilipinas Shell Petroleum Port, while most domestic passenger ships docked at the government port in Batangas City. Vessel traffic is expected to intensify when the ongoing construction to convert the Batangas City's domestic port to international port is completed and becomes fully operational.

3.2 Local Government

Public and private sector institutions jointly administer the Batangas Bay Area. The government institutions involved include the Department of Environment and Natural Resources, the Philippine Coast Guard, the Department of Agriculture, Department of Education, Culture and Sports and the local government units composed of the provincial and municipal governments. The private sector includes the firms and corporations located in the Bay region, other NGOs and local communities.

The mayor controls all programs and activities of the city. The City Development Council supports the mayor, providing directions and coordinating development efforts. The Sangguniang Panglunsud, or City Council, is chaired by the city vice-mayor and operates as the legislative branch of the city government.

The key stakeholders in the City of Batangas are the DENR (Department of Environment & Natural Resources) central office including its regional and provincial offices, local government departments, barangay officials, Metro Batangas Water District, industry and the public.

The DENR and the Local Sangguniang Panglungsod basically formulate national and local environmental policies. The policy formulation process does not require participation from public or private sector stakeholders. To strengthen environment management, the city appointed a CENRO (Community Environment and Natural Resources Officer) who also holds a concurrent position in the city mayor's office. However, his role in environmental monitoring is limited and constrained by the lack of personnel with expertise in monitoring, and by the lack of necessary facilities and equipment.

3.3 Batangas Bay Environmental Issues and Initiatives

The *environmental issues* identified in an Integrated Coastal Environmental Profile of the region can be classified into eight major areas of concern:

- ❖ solid waste generation, collection and disposal,
- ❖ water and air pollution,
- ❖ municipal fishing,
- ❖ mining and quarrying,

- ❖ shipping and port development,
- ❖ human settlements and population growth in coastal areas,
- ❖ participation of NGO organizations, and
- ❖ integrated policies, plans, programs, and institutional support.

To address this range of issues, public and private sector stakeholders within the Province of Batangas, along with interested central government agencies, created the Integrated Coastal Management (ICM) Project. This United Nations project is funded by the U.N. Global Environment Facility (GEF) and implemented by the International Maritime Organization (IMO). Over the past five years, IMO has been working with the Province of Batangas to test and monitor a working ICM model.

A primary objective of the ICM program is to develop and demonstrate workable models for reduction and prevention of marine pollution. Important early outputs of the program included an Environmental and Socioeconomic Profile of the coastal area, a Strategic Environmental Management Plan (SEMP), and an Action Plan on Integrated Waste Management. The SEMP, a product of consultation with local and national government officials, private sector representatives, and other local NGO groups over a two-year period. Six key components of the SEMP include:

1. Legal and Institutional Mechanisms—This component supports the establishment and strengthening of legal and institutional frameworks for planning and implementing integrated environmental management programs,
2. Integrated Policy and Planning Systems—This component provides: (a) integration and improvement of national, regional, provincial, and municipal plans and policies in environmental management; (b) a land-and water-use plan for future development of the region; (c) improved policy support systems for land-and water-use zoning, creation of market-based instruments (MBIs), and resource-use pricing structures; and (d) strengthening of enforcement and monitoring capability of regional and local authorities,
3. Integrated Management Systems and Technical Interventions—This component enables improvements of management systems and application of technical solutions to critical environmental problems in the region, such as integrated waste management, water pollution abatement, conservation of coastal ecosystems (mangroves and coral reefs), coastal tourism development, municipal fishery development, and alternative livelihood development.
4. Management and Technical Skills Improvement—This component provides: (a) training for regional personnel, LGU staff involved in environmental management, and other support organizations in planning and managing sustainable programs; (b) organizational services to promote environmental management and community development initiatives; and (c) a multi-sector

information, education, and communication system promoting integration of environmental education into the classroom curricula.

5. **Information Base Improvement**—This component addresses the lack of an information required for scientific assessments of environmental issues and implementation of solutions by: (a) carrying out research and extension services to generate primary user-friendly data for integrated environmental planning and management; and (b) establishment of an information system that utilizes Geographic Information Systems (GIS) technology for sound planning and management.
6. **Sustainable Financing Development**—This component identifies and develops innovative financing mechanisms including privatization, build-operate-transfer (BOT) schemes, trust funds, and mobilization of government and private sector resources. Financing of management and technological capacity building, action plan formulation and some capital-intensive projects will depend on foreign funding institutions and local donors.

3.4 Legislations/Ordinances

National: The Local Government Code (Republic Act 7160) authorizes local government responsibility for ecological management. The Code mandates municipal governments to adopt solid waste management systems and provide services related to local sanitation. Pollution control is vested in the provincial governments, which are authorized to enforce pollution control laws, the law on regulation of small-scale mining, and other environmental protection laws.

Nine years after the implementation of this Code in 1992, the devolution of certain DENR functions to the LGUs is not proceeding as efficiently and effectively as envisioned. The process of implementation is met with conceptual, legal, procedural and other issues. Despite these constraints, LGUs are empowered to draw up an integrated environmental management plan to fill in the gaps in the LGC.

Provincial/Municipal: Ordinance No. 5, Series of 1993—Environmental Awareness Program—this ordinance established a program on environmental awareness for elementary school children. It consists of a) regular contest on essay writing and poems, painting and other means to express environmental protection, b) regular information dissemination on rules and regulations related to environmental protection; and c) field trips to areas to be protected for impact observations.

Ordinance No. 4, Series of 1994—Providing for a Continuing Greening Program—The greening program includes operation and maintenance of provincial nurseries, adoption of a year-round schedule of planting and replanting, establishment of mini-forest parks, and plaza beautification projects.

Ordinance No. 6. Series of 1991—Comprehensive Waste Disposal and Management System—This ordinance specifies the garbage collection fee by establishment, provides instructions disposal of wastes (plastics or containers), and stipulates penalties for dumping of wastes in places other than areas designated as accessible to garbage trucks.

Ordinance No.3, Series of 1996—Adoption of a Strategic Environmental Management Plan (SEMP)—With the completion of the SEMP in 1996, an ordinance was passed by the Provincial Governor declaring the document an administrative guide for future development, environment policies, plans, and programs. The ordinance formally adopted the 20-Year SEMP along with an Integrated Waste Management Plan, and was highly critical to the successful implementation of the SEMP. It also facilitated access to the larger financing institutions as a reflection of political commitment.

Despite the passage of the SEMP ordinance five years ago, the original policies and ordinances control and regulate agriculture, commercial and industrial development programs of the Batangas Bay Region. As yet, there is no serious effort to provide incentives to encourage or reward the use of Cleaner Production practices.

3.5 Environmental programs

Urban Waste Exchange Program (UWEP)—This six-year solid and liquid waste management program (1995-2000) aims to develop expertise through research and pilot implementation. The Netherlands Government funds the program, and it is managed by a Netherlands consulting firm. UWEP projects in the region include: (1) Establishment of Local Waste Coordinating Body; (2) Development of Community-Based Waste Management System Under a Community Private Partnership; (3) Enhancement of Resource Recovery and Recycling Sector; and (4) Establishment of an Integrated Sustainable Waste Management.

Batangas Bay Watch—Under this government-sponsored program, students from the province volunteer as Bay-Watchers. The objective is to increase awareness and involvement in protection of the Bay environment. Under the program, bay-watchers are deputized as environmental agents, who report violations of environmental laws and ordinances. Bay Watchers also disseminate information related to environmental pollution. Volunteer bay-watchers enjoy access to ENRO's library, databanks and audiovisual materials, and free laboratory analysis of water quality to augment student resources. To date, the Batangas Bay Watch membership stands at 2000, a force which is actively involved in various activities such as campus upkeep, coastline clean-up, and community outreach on ecological waste management.

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